

fy, in my opinion, a description and name for this species. It is possible, further, that this may have some stratigraphic significance, occurring as it does rather commonly in the late Pleistocene and so rarely living.

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NEW AND PROBLEMATIC WEST AMERICAN LAND SNAILS  
BY H. BURRINGTON BAKER

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(Continued from p. 101)

PRISTILOMA NICHOLSONI, new species.

Shell (pl. 5, figs. 5-7): minute, rimate, thin, vitreous. Color: light horn, almost white. Whorls: 4  $\frac{1}{4}$ , quite rapidly increasing in diameter, well rounded, although slightly flattened above; suture beveled over each preceding whorl so as to appear broadly margined. Apical whorls: apparently smooth. Sculpture of later whorls: growth-lines irregularly spaced, faintly impressed, slightly stronger on umbilical side and very weakly arcuate at suture; spiral striae weak and closely spaced (somewhat like in *Zonitoides arboreus*). Umbilicus: small and rendered rimate by peculiarly expanded columellar angle of peristome. Aperture: narrowly crescentic and nearly vertical. Peristome: sharp and simple on palatal and basal sides, but expanded towards columellar angle, which is free from preceding whorl so that it forms a triangular tongue which almost hides the umbilicus.

Cotype (figs. 5 and 7): alt. 1.08 mm., maj. diam. 187 (2.02 mm.), min. diam. 169 (1.82), alt. apert. 90 (.97), diam. apert. 101 (.98); apical whorls eroded. Another cotype (fig. 6): alt. 1.05 mm., maj. diam. 196 (2.06), min. diam. 175 (1.84), alt. apert. 89 (.94), diam. apert. 104 (.98); 4  $\frac{1}{4}$  whorls.

*Type Locality*:—Under pieces of wood on hillside near spring brook (first small branch below Big Carson Creek)

about two miles south of Lagunitas, Marin County, California; collected by Mr. John Nicholson of the California Academy of Sciences and myself on July 19, 1929 (No. 149978, in Acad. Nat. Sci. Philadelphia).

In general appearance, this species is most like *Vitrea johnsoni* Dall (1895, Naut. 9: 27), from Seattle, Washington, which was named from incompletely developed specimens (paratypes examined) of what was later much more recognizably described as *Pristiloma taylori* Pils. (1899, Proc. Acad. Nat. Sci. Philadelphia 51: 185, pl. 9, figs. 6-8), from Nanaimo, Vancouver Island. But, when adult, *P. johnsoni* has more rapidly expanding whorls than the Californian species and is imperforate, while the columellar expansion of *P. nicholsoni*, although similar in shape, is depressed below the umbilicus so as to leave an open rima.

In order to estimate the systematic position of this and related species, I have made preliminary dissections of topotypes of *Zonites stearnsi* Bland (1875, Ann. Lyc. Nat. Hist. N. Y. 11: 76, fig. 3) from Astoria, Oregon, which is now designated as the type of *Pristiloma* Ancey (1887, Conch. Ex. 1: 54). *Anceyia* Pilsbry [1887? (certainly after Dec. 28, 1886), Conch. Ex. 1 (6): 26], which has been recently revived for this genus, is preoccupied by *Anceyia* Mabilie [1886! (Aug. 14 séance the last one reported), Bull. Soc. Philom. France (7) 10: 128]. The anatomy of *Pristiloma stearnsi* is remarkably similar to that in the European genus *Vitrea* Fitz., but the genitalia of the American species have a large, sausage-shaped spermatheca, the apex of which does not quite reach the aorta. For the present, the two genera had best be kept separate, but *Pristiloma* is certainly more closely related to *Vitrea* than to the other American Vitreinae (*Pseudovitrea*, *Paravitrea*, etc.).

I have also examined the anatomy of topotypes of *Hyalina subrupicola* "Dall" Packard (1877, Bull. U. S. G. and G. Surv. Terr. 3, No. 1: 163, fig. 7), from Clinton Cave, near Lake Point, Tooele Co., Utah, which is the monotype

of *Ogaridiscus* Chamberlin and Jones (1929, Bull. Univ. Utah 19, No. 4: 96). The structure of *P. subrupicola* is, in the main, like that of *P. stearnsi*, but the spermatheca is of the ordinary long type. Of course, Chamberlin and Jones would have more closely approximated the true systematic relationships, both on conchological and on anatomical grounds, if they had used *Vitrea* for *P. subrupicola*, instead of adopting it for *Retinella* (*Glyphyalinia*) *indentata* (subfamily Zonitinae). Nevertheless, unless intermediate characters are found in the other species, *Ogaridiscus* seems to require at least sectional recognition. It probably includes: *P. johnsoni* (Dall), *P. nicholsoni*, *P. subrupicola subrupicola* (Dall), *Vitrea subrupicola spelaea* Dall (1895, Naut. 9: 27) from Cave City, Calaveras Co., Cal., *Zonites shepardi* "Hemphill" W. G. B. (1892, Bull. Mus. Comp. Zool. 22, No. 4, 167) from Santa Catalina Island, Cal., and *Polita gabrielina* Berry (1924, Naut. 37: 130, fig. 3), from San Gabriel Mts., San Bernardino Co., Cal. I have examined a dried animal from a paratype of *Pristiloma gabrielinum*; its radula is similar to that in the other members of the genus and its sole appears to be undivided. The first three species, at least, are more or less subterranean in habits; *P. johnsoni* usually lives on the surface of buried rocks in fairly fresh dirt and rock-slides (*Oregon*: South Oswego, Clackamas Co.; Riverdale, Multnomah Co.; near Astoria, Clatsop Co. *Washington*: Point Ellis, Pacific Co.; McAleer Creek, near Seattle, King Co.; just north of mouth of Quillayute River, Clallam Co.).

*PRISTILOMA CHERSINELLA WASCOENSE* (Hemphill).

*Tonites* (*Conulus*?) *wascoensis* Hemph. (1911, Trans. San Diego Soc. Nat. Hist. 1: 102), Wasco Co. and near Salem, Marion Co., Oregon.

?*Polita chersinella* Berry (1919, Proc. Acad. Nat. Sci. Philadelphia 71: 196, 199, 203), Glacier National Park, Montana (ANSP No. 115650).

Additional localities (?): along creek east of Meadows (old town), Adams Co., Idaho; ANSP 82339, Big Payette

Lake, Boise Co., Idaho (Rev. E. H. Ashmun!); ANSP 82367, Price Valley, Weiser Canyon, Washington Co., Idaho (Rev. E. H. Ashmun!).

The only distinctive feature in Hemphill's description is his remark that *wascoensis* is very similar to *chersinella*, but is about half the size with the same number of whorls. This also fits the Idaho specimens cited above, while the Montana shell is slightly larger, although still much smaller than topotypes of typical *Helix chersinella* Dall (1866, Amer. Jour. Conch. 2: 328, pl. 21, fig. 4) from Big Trees, Calaveras Co., Cal. I can present no proof of intergradation between *wascoense* and *chersinella*, but prefer not to recognize the former as a distinct species until someone has competently described and accurately figured the types.

A large series of shells from near Ouxy, on the east shore of Upper Klamath Lake, Klamath Co., Oregon, collected July 28, 1929, average slightly higher than typical *chersinella* but attain the same size. I have dissected one of these and, although not quite mature, it certainly belongs to *Pristiloma*, but has the long type of spermatheca, like *P. subrupicola*. In shell characters, *P. chersinella* combines the thicker epidermis and quite close whorls of *Pristiloma* s. s., with an open umbilicus like most species of *Ogaridiscus*. I have additional animals from the type locality and elsewhere in the Sierra Nevadas and hope to make more detailed dissections in the near future.

PRISTILOMA ARCTICUM (Lehnert).

Additional localities: Paradise Valley (near timberline on Mt. Ranier) down to near Longmire (5,000-3,000 ft.), Pierce Co., Washington.

Through the kindness of Dr. G. D. Hanna, I have been able to compare these specimens with Alaskan examples and can detect no salient differences.

RADIODISCUS (RADIODOMUS) ABIETUM, new subgenus and species.

Shell (pl. 6, figs. 2-4): small (6.7 mm.), subdiscoid, umbilicate, thin, but with heavy, almost opaque epidermis.

Color: light chocolate-brown. Whorls: maximum  $5\frac{3}{4}$ , gradually increasing in diameter, well rounded but markedly flattened above; last slightly descending; suture deep. Embryonic whorls: 2 to  $2\frac{1}{4}$ ; spiral ridgelets prominent, closely spaced (14 visible) and beginning at very apex. Sculpture of later whorls: growth-riblets quite low but angular and sharply defined, markedly and broadly concave below periphery, protractive near umbilicus, scarcely arcuate near suture; interspaces 2-3 times as broad as riblets; spiral striae (with interstitial ridgelets) very closely spaced, fine but deep and sharp in interspaces, usually obliterated at summit of riblets. Umbilicus: about 6.1 times in maj. diam. of shell; with almost vertical walls. Aperture: crescentic, slightly oblique (about  $20^\circ$  from axis of shell). Peristome: simple and sharp, quite deeply and broadly concave below periphery; parietal callus weak.

*Type* (immature):—alt. 2.61 mm., maj. diam. 187 (4.89 mm.), min. diam. 177 (4.61), alt. apert. 79 (2.07), diam. apert. 113 (2.33); 5 whorls. Largest paratype (broken): maj. diam. 6.7 mm.;  $5\frac{3}{4}$  whorls.

*Type Locality*:—Estivating (near end of driest summer in history of region) on surface of partially buried rocks, at base of a steep slope near mouth of East Fork of Weiser River, on Stevens Ranch (alt. 3,600 ft.), Adams Co., Idaho, (No. 149979, Acad. Nat. Sci. Philadelphia). Other localities: east of Meadows (old town) and south of New Meadows, in valleys at headwaters of Little Salmon River (alt. 4,000-4,500 ft.), in same county.

Stevens Ranch is near the lower limit of the conifer zone. The crests of the ridges and the most exposed slopes are covered with bunch-grasses; the less exposed slopes develop open stands of rock pine; the more protected valley-sides are dominated by Douglas fir, mixed locally with larch; while the bottom of the canyons are characterized by a white-barked fir (*Abies* sp.), blue spruces and, along the creeks, alder and red dogwood. The snails are mainly near the streams. Stevens Ranch is also the type locality



of *Pristiloma idahoense*, which estivates in about the same places as *R. abietum*. *Microphysula ingersolli* buries itself more deeply in the same rock-piles, but *Zacoleus idahoensis* (often mummified by the extreme drouth), *Polygyra ptychophora* and *P. mullani olneyae* are usually nearer the surface. *Anguispira kochi occidentalis* is also very common along Goose Creek, near Meadows, where the forest is more dominant.

Although its shell-sculpture is as usual in the genus, *Radiodiscus abietum* is much larger than the other North American species. In addition its spire is more nearly flat, its umbilicus is relatively smaller and its growth-riblets are more curved than in *R. millecostatus*. An adult ( $5\frac{1}{2}$  whorls) from Goose Creek valley and another ( $5\frac{1}{4}$  whorls) from the headwaters of the Little Salmon furnish data for anatomical comparison with *R. millecostatus costaricensis* (H. B. B.: 1927, Proc. Acad. Nat. Sci. Philadelphia 79: 230, pl. 17, figs. 21-24) and with *R. (Radioconus) bactricola* (op. cit.: 231, pl. 17, figs. 25-30). Only divergent details are stressed.

Animal: sides of foot slightly pigmented; head and tentacles black. Mantle collar (pl. 6, fig. 6): similar to *bactricola*. Lung: over three times as long as its base and about four times length of kidney; wall mottled with black. Heart: relatively small; auricle broad and short; principal vein passes ventral to ureter and dorsal to tip of kidney; minor venation indistinct. Kidney: thick, little longer than its base and half again as long as pericardium; apical (right) limb weak; basal (left) point produced between pericardium and ureter. Ureter: "primary" region swollen and U-shaped with left arm produced beyond pericardium; terminal loop short and ventral to kidney; "secondary" continuation slender and less than half length of lung.

Genitalia (pl. 6, figs. 5 and 7): male organs well developed; uterus and albumen gland slender. Ototestis: consisting of a few, large, long-clavate alveoli, imbedded in lower two-thirds of liver; duct very long, swollen and con-

volute near its lower end; talon clavate, with a slender appendix. Uterus: apical end with two sacculate enlargements. Free oviduct: short and slender. Spermatheca: sac clavate, imbedded near columellar side of uterus; stalk medium in length, almost columellar in position to near base of uterus. Vagina: exceptionally long, swollen near middle. Prostate: long type, covering all of outer surface of uterus. Vas deferens: caught into penioviducal angle by tentacular retractors. Epiphallus: elliptical, with small lumen; wall thickened asymmetrically and marked by radiating, glandular columns; penial papilla short and conical, forming a slight, lateral projection near apex of penial lumen. Penis: exceptionally large, with two apical appendices ("flagella"); penis proper long fusiform, wall longitudinally plicate internally from apex to thick-walled swelling; larger appendix an ellipsoid continuation of penis proper, with thick, glandular wall; smaller appendix ovoid, with muscular wall, which develops two internal pilasters, opening into penial apex on side opposite vas deferens. Penial retractor: heavy and short; origin from diaphragm; insertion on apex of larger appendix. Cloaca: as in *costaricensis*.

Columellar muscle: similar to that in *R. bactricola*, but buccal muscle is almost free, left and right common retractor arise simultaneously (although right one does not subdivide until near buccal mass) and both right ocular and right muscle to inferior tentacle pass through penioviducal angle and between descending and ascending limbs of vas deferens. Jaw: similar to that in *R. bactricola*; 21 plates counted. Radular formula (pl. 6, fig. 1): 9-12-1-21; 91 transverse rows counted. Central: slightly smaller than first lateral and tricuspid. Laterals: asymmetric, bicuspid (entocone absent); outer teeth becoming shorter. Marginals: shorter and broader, but not sharply demarcated from laterals; ectocones more numerous but variable; entocone always absent.

*R. abietum* has the shell-sculpture of a *Radiodiscus* and

probably is more closely related to that group than any other. Nevertheless, its extreme anatomical divergence would warrant the erection of a new genus. Especially peculiar features of the new monotypic subgenus, *Radiodomus*, are: (1) its exceptionally long "primary" ureter, (2) its spermatheca which is of the short type and almost columellar in position, (3) its two penial appendices (flagella) and (4) the complete absence of entocones from its radula. This last feature, taken by itself, would transfer *Radiodomus* to the Endodontinae, but I believe it is more than counterbalanced by the primitive kidney and jaw, which are most like those in *Radiodiscus* and the other Helicodiscinae.

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#### TYPE OF ANODONTITES BRUGIÈRE

BY WILLIAM B. MARSHALL

U. S. National Museum  
United States National Museum

Thiele, 1909 (Nachr. deutsch. Malak. Gesell.), and Ortmann, 1911 (NAUTILUS, Vol. 25, pp. 88-91), did a real service to students of South American malacology in reviving Bruguière's generic name *Anodontites* (Journ. de Hist. Nat., Vol. 1, pp. 103-109, pl. 8, figs. 6, 7, 1792), proving that it is a perfectly valid name, and takes precedence over Gray's name *Glabaris* (Proc. Zool. Soc. London, p. 197, 1847).

The type of *Anodontites* is *crispata* Brug. (l. c.). That has been settled beyond a doubt. Ortmann, 1921, "South American Naiades" (Mem. Carnegie Museum, Vol. VIII) gives a detailed description and a number of figures of what he took to be *A. crispata* Brug. Unfortunately his identification was incorrect. The specimens he figured are *Anodontites colombiensis* Marshall, 1922 (Proc. U. S. Nat. Mus., Vol. 61, p. 7, pl. 1, fig. 5, pl. 2, figs. 13, 14, pl. 3, figs. 5, 13, 14.)